Unlocking Memory Metal Power Generation & Energy Conversion

Completed Technology Project (2016 - 2018)

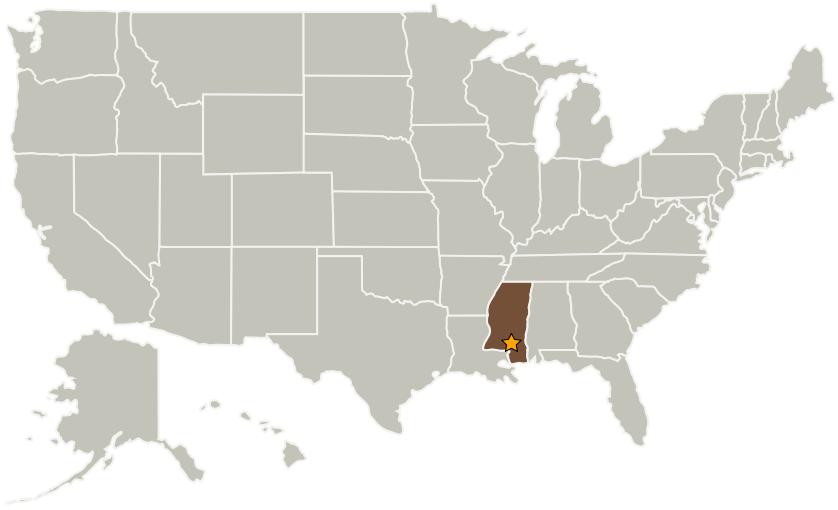
Project Introduction

Continued from FY17... A new memory metal power generator is being developed using small mass and special Electro Fluid Acceleration techniques that permit high cyclic rates to be efficiently achieved in producing kW levels of power. The 2 array push-pull E-TAC design from the FY16 effort has achieved high mechanical output with a very low power consumption in the laboratory environment. The FY17 effort will: 1) construct a lightweight field deployable unit, 2) Make units fully contained with internal storage and load, 3) Make units simple to fasten to a cold or hot source, 4) Attempt to achieve 1kW electric power at 6000 RPM cyclic rate.

Anticipated Benefits

This technology, with its innovative rapid thermal exchange capability, offers a novel new option for kW power generation in environments with thermal variation as low as 10 degrees Celsius in a much more compact and lower weight package than other similar technologies at present. Applications exist not only for space and planetary surface environments but also numerous ground based uses on Earth. This kind of generator can be scaled-down for use within MEMS devices, or scaled-up for use in municipal power plants capable of producing power from naturally occurring thermal sources, and sized in between to support NASA planetary and Exploration missions.

Primary U.S. Work Locations and Key Partners



Electro-Thermal Power Generator Prototype 1

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Center Innovation Fund: SSC CIF

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Organizations Performing Work	Role	Type	Location
★Stennis Space Center(SSC)	Lead Organization	NASA Center	Stennis Space Center, Mississippi

Co-Funding Partners	Type	Location
Space Technology Mission Directorate(STMD)	NASA Mission Directorate	

Primary U.S. Work Locations
Mississippi

Images

Project Image
Electro-Thermal Power Generator Prototype 1
(https://techport.nasa.gov/image/35813)

Project Website:

https://www.nasa.gov/directorates/spacetech/home/index.html

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Center / Facility:
Stennis Space Center (SSC)

Responsible Program:
Center Innovation Fund: SSC CIF

Project Management

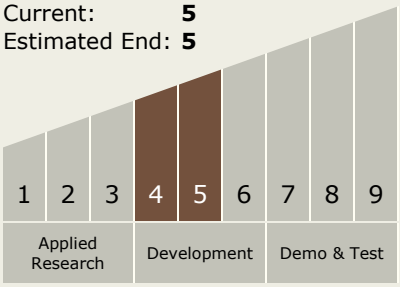
Program Director:
Michael R Lapointe

Program Manager:
Ramona E Travis

Principal Investigator:
Scott L Jensen

Technology Maturity (TRL)

Start: **4**
Current: **5**
Estimated End: **5**



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Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.1 Materials
    - TX12.1.6 Materials for Electrical Power Generation, Energy Storage, Power Distribution and Electrical Machines

Target Destinations

Earth, Mars, Foundational Knowledge